

Appendix A

Major Changes for Laboratory Medicine with Connect Care in the South Sector

A. Transfusion Medicine	Pg. 1
B. Point of Care Testing	Pgs. 1-7
C. Clinical Microbiology	Pgs. 7-10

A. Transfusion Medicine

There are several resources available pertaining to transfusion medicine in the Connect Care Knowledge Library and the Learning Home Dashboard. The most comprehensive resource for EPIC / WellSky information is called the Blood Administration Manual Search: Blood administration guide | Insite (albertahealthservices.ca) There are also 6 modules within My Learning Link dedicated to different aspects of Blood Administration. More generic transfusion medicine resources continue to be available on Insite and AHS websites (<https://insite.albertahealthservices.ca/lab/Page7421.aspx> and <https://www.albertahealthservices.ca/lab/Page3318.aspx>).

Transfusion Prenatal testing should continue to be ordered on the Canadian Blood Services requisition. Work is underway to build a reference laboratory interface to allow results to flow back to the Connect Care chart. For Rh negative prenatal and postpartum patients, please ensure ordering of Prenatal and Postnatal Evaluation to ensure that eligibility for Rh Immune Globulin can be assessed.

For patients who are admitted under an alias name and have Type and Screen testing performed using that alias, do not remove the alias arm band or the TSIN band until the Type and Screen expires or is recollected. Since transfusion of red cells, platelets, plasma and cryoprecipitate requires administration within an approved facility, pre-transfusion testing and blood component requests will be restricted to physicians who have privileges within those environments.

It is very important to ensure that the orders for transfusion are placed in the correct facility and encounter for where the actual transfusion is to occur to avoid loss of orders or components being sent to the incorrect location.

B. Point of Care Testing (POCT)

1. **Connectivity of POCT devices**

A controlled connectivity rollover of POCT devices to the POCT AegisPOC data management middleware, and then into Epic will occur in conjunction with Connect Care Launches. Results from POCT devices will either directly flow from the device through the new POCT middleware into the electronic medical record (i.e. connectable) or be manually entered into Epic using Enter/Edit functionality and resulted in the electronic medical record (non-connectable).

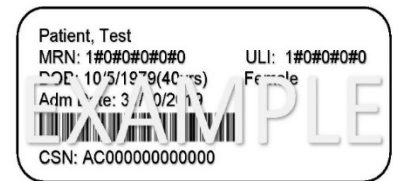
Launch 4 Go-Live device workflows:

- Connected devices:
 - [Roche Accu-Chek Inform II Glucose Meter](#)
 - [Abbott i-STAT1 and i-STAT Alinity](#)
 - [Radiometer ABL90 Flex Plus](#)
 - [Siemens Clinitek Status Plus](#)
 - [Werfen GEM 5000](#)
 - [Siemens DCA Vantage](#)
 - [Siemens CoaguChek XS Pro](#)
 - Werfen Avoximeter 1000E (documents in development, see [Connect Care Resources](#))

- Unconnected devices:
Patient results from unconnected POCT devices will require **manual** entry into Epic using the Epic **“Enter/Edit”** function directly by the person performing the test. See your clinical practice area Connect Care training documents for instruction.

Adhere to the following requirements when performing POCT:

- Healthcare Professionals / Providers must:
 - Receive POCT certification requirements to access devices.
 - Zone POCT department will provide device access through the POCT middleware system.
 - Barcode scan or manually enter their AHS employee ID barcode number to access POCT devices.
- Patient identification:
 - Each patient must be identified using the valid, Epic-generated patient encounter number (Contact Serial Number [CSN]).
 - Use of the correct CSN is **REQUIRED**. This is **NEW!!**
 - CSN usage ensures that results flow correctly and uninterrupted to Epic.
 - For additional CSN education, see *AHS My Learning Link: POCT-Connect Care Requirements*.



2. POCT Reference Interval and Critical Value Standardization

a) Anion Gap

- Standardization of reference intervals by POCT device (Launch 4 sites included below):

Testing Site	Instrument	Reference Interval (mmol/L)
Alberta Children’s Hospital Peter Lougheed Centre	GEM5000	4 – 16

b) Ionized Calcium

- Standardization of critical values: <0.80 mmol/L and >1.50 mmol/L
Standardization of reference intervals by POCT device for “Calcium, Ionized” and “Calcium Ionized, pH normalized” (Launch 4 sites included below):

Testing Site	Instrument	Reference Interval (mmol/L)
Alberta Children’s Hospital Peter Lougheed Centre	GEM5000	0.9 – 1.3 (<29 d) 1.15 – 1.35 (≥29 d)
Alberta Children’s Hospital	iSTAT Alinity	1.15 – 1.35

c) **Macroscopic urinalysis**

- Standardization of reference intervals:

Analyte	Reference Interval	Units
Blood, Urine	Negative	Ery/ μ L
Clarity, Urine	Clear	
Color, Urine	Colourless, Yellow, Amber	
Glucose Urine	Negative	mmol/L
Ketones, Urine	Negative	mmol/L
Leukocyte Esterase, Urine	Negative	Leu/ μ L
Nitrites, Urine	Negative	-
pH, Urine	5.0-8.0	-
Protein, Urine	Negative	g/L
Specific Gravity	1.005-1.030	-

- **Macroscopic Urinalysis Reporting**

With each Connect Care Launch, all POCT urinalysis patient test results must be reported into the Epic patient electronic medical record. This requirement applies to both **Manual** (dipstick) and **Automated** (Clinitek Status®+) testing. All reporting units for urinalysis testing in Epic in EPIC have been standardized provincially to SI units, which provides a numerical result rather than using other reporting schemes (e.g., 1+/2+/3+, small/medium/large).

Table 1. Urinalysis result reporting for Connect Care

Test component	Siemens Clinitek Status	Manual Dipstick Urinalysis	Connect Care (Epic) Result Reporting
	Device result reporting	Test strip vial reporting	
Color	Colorless Yellow Amber Orange Red Brown Other	Colorless Yellow Amber Orange Red Brown Black Other	Colorless Yellow Amber Orange Red Brown Black Other
Clarity	Clear Slightly Cloudy Cloudy Turbid Other (do not use)	Clear Slightly Cloudy Cloudy Turbid	Clear Slightly Cloudy Cloudy Turbid
SG (Specific Gravity)	≤ 1.005 1.010 1.015 1.020 1.025	1.000 1.005 1.010 1.015 1.020 1.025 1.030	<1.005 1.005 1.010 1.015 1.020 1.025 1.030

Test component	Siemens Clinitek Status	Manual Dipstick Urinalysis	Connect Care (Epic) Result Reporting
	Device result reporting	Test strip vial reporting	
	≥1.030 Unable to interpret due to interfering substance	Unable to interpret due to interfering substance	≥1.030 Unable to interpret due to interfering substance
pH	5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 ≥9.0	5.0 6.0 6.5 7.0 7.5 8.0 8.5	5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 ≥9.0
LEU (Leukocytes) Leu/μL	Negative Ca 15 Ca 70 Ca 125 Ca 500	Negative Trace (15) Small (+) (70) Moderate (++) (125) Large (+++) (500)	Negative 15 70 125 500
NIT (Nitrite)	Negative Positive	Negative Positive	Negative Positive
PRO (Protein)	Negative Trace 0.3 1.0 ≥3.0	Negative Trace 0.3 1.0 3.0 ≥20	Negative Trace 0.3 1.0 ≥3.0 ≥3.0
GLU (Glucose) mmol/L	Negative 5.5 14 28 ≥55	Negative 5.5 14 28 55 ≥111	Negative 5.5 14 28 ≥55 ≥55
KET (Ketone) mmol/L	Negative Trace 1.5 3.9 7.8 ≥15.6	Negative 0.5 1.5 4.0 8.0 16.0	Negative Trace 0.5 1.5 3.9 ≥7.8 ≥7.8 ≥7.8 ≥7.8
ERY (Erythrocytes) Ery/μL	Negative Trace-Lysed Trace-Intact Ca 25 Ca 80 Ca 200	Negative Non Hemolyzed Trace Non Hemolyzed Moderate Hemolyzed Trace Small (+) (25) Moderate (++) (80) Large (+++) (200)	Negative Trace Trace Trace 25 80 200

d) Blood Gas Tests

The following reference intervals and critical values were standardized for the province in preparation for Connect Care Implementation through Clinical Knowledge and Content Management (CKCM). The Working Group assigned to this was created in consultation with the Critical Care Strategic Clinical Network, the Provincial Respiratory Professional Practice Council, and Laboratory Point of Care Testing Network, with additional experts consulted as required.

Note: Avoximeter device will be part of the standardized blood gas reporting for Launch 4

Arterial

Analyte	Reference Interval	Units	Critical Values	
pH	7.35 – 7.45	None	< 7.20	> 7.60
pCO ₂	35 – 45	mmHg	<20	>70
pO ₂	70 – 90	mmHg	<56	None
Bicarbonate (HCO ₃)	20 – 27	mmol/L	< 10	> 40
Total CO ₂	Not Reported	-	-	-
Base Excess	-4 to 1	mmol/L	None	None
Oxygen Saturation	90 – 100	%	None	None
Oxyhemoglobin	92 – 98	%	None	None
Carboxyhemoglobin	0.0 – 3.0	%	None	>15
Methemoglobin	0.0 – 1.5	%	None	>10
Deoxyhemoglobin	Not Reported	-	-	-
AaDO ₂	<15 Room Air <100 100%O ₂	mmHg	None	None

Venous

Analyte	Reference Interval	Units	Critical Values	
pH	7.30 – 7.40	None	< 7.15	> 7.55
pCO ₂	35 – 50	mmHg	< 15	>55 if pH < 7.2
pO ₂	30 – 50	mmHg	None	None
HCO ₃	20 – 27	mmol/L	< 10	>40
Total CO ₂	Not Reported	-	-	-
Base Excess	-4 to 1	mmol/L	None	None
Oxygen Saturation	50 – 80	%	None	None
Oxyhemoglobin	50 – 80	%	None	None
Carboxyhemoglobin	0.0 – 3.0	%	None	>15%
Methemoglobin	0.0 – 1.5	%	None	>10%
Deoxyhemoglobin	Not Reported	-	-	-

Capillary Blood Gas

Analyte	Reference Interval	Units	Critical Values	
pH	7.32 – 7.42	None	< 7.20	> 7.50
pCO ₂	35 – 45	mmHg	< 25	> 70
pO ₂	None	mmHg	None	None
HCO ₃	20 – 27	mmol/L	<10	>40
Total CO ₂	Not Reported	-	-	-
Base Excess	-6 to 1	mmol/L	None	None
Oxygen Saturation	90 – 100	%	None	None
Oxyhemoglobin	85 – 95	%	None	None
Carboxyhemoglobin	0.0 – 3.0	%	None	>15%
Methemoglobin	0.0 – 2.0	%	None	>10%
Deoxyhemoglobin	Not Reported	-	-	-

Mixed Venous

Analyte	Reference Interval	Units	Critical Values	
pH	7.30 – 7.40	None	None	None
pCO ₂	35 – 50	mmHg	None	None
pO ₂	None	mmHg	None	None
HCO ₃	None	mmol/L	None	None
Total CO ₂	Not Reported	-	-	-
Base Excess	None	mmol/L	None	None
Oxygen Saturation	None	%	None	None
Oxyhemoglobin	None	%	None	None
Carboxyhemoglobin	0.0 – 3.0	%	None	>15
Methemoglobin	0.0 – 1.5	%	None	>10
Deoxyhemoglobin	Not Reported	-	-	-

Central Venous

Analyte	Reference Interval	Units	Critical Values	
pH	7.30 – 7.40	None	None	None
pCO ₂	35 – 45	mmHg	None	None
pO ₂	None	mmHg	None	None
HCO ₃	None	mmol/L	None	None
Total CO ₂	Not Reported	-	-	-
Base Excess	None	mmol/L	None	None
Oxygen Saturation	None	%	None	None
Oxyhemoglobin	None	%	None	None
Carboxyhemoglobin	0.0 – 3.0	%	None	>15
Methemoglobin	0.0 – 1.5	%	None	>10
Deoxyhemoglobin	Not Reported	-	-	-

ECMO

Analyte	Reference Interval	Units	Critical Values	
pH	7.30 – 7.45	None	None	None
pCO ₂	35 – 50	mmHg	None	None
pO ₂	None	mmHg	None	None
HCO ₃	None	mmol/L	None	None
Total CO ₂	Not Reported	-	-	-
Base Excess	None	mmol/L	None	None
Oxygen Saturation	None	%	None	None
Oxyhemoglobin	None	%	None	None
Carboxyhemoglobin	None	%	None	None
Methemoglobin	None	%	None	None
Deoxyhemoglobin	Not Reported	-	-	-

Cord Blood Gas - Arterial

Analyte	Reference Interval	Units	Critical Values	
pH	7.2 – 7.4	None	<7.15	None
pCO ₂	35 – 70	mmHg	None	None
pO ₂	Not Reported	mmHg	-	-
HCO ₃	17 – 27	mmol/L	None	None
Total CO ₂	Not Reported	-	-	-
Base Excess	-9 to +2	mmol/L	< -10	None
Oxygen Saturation	Not Reported	-	-	-

Cord Blood Gas - Venous

Analyte	Reference Interval	Units	Critical Values	
pH	7.25 – 7.45	None	<7.15	None
pCO ₂	30 – 55	mmHg	None	None
pO ₂	Not Reported	mmHg	-	-
HCO ₃	16 – 25	mmol/L	None	None
tCO ₂	Not Reported	-	-	-
Base Excess	-10 to 0	mmol/L	< -10	None
Oxygen Saturation	Not Reported	-	-	-

pH Fluid

Analyte	Reference Interval	Units	Critical Values	
pH	>=7.20	None	None	None

C. Clinical Microbiology

1. Ordering COVID-19 and other respiratory virus testing in Connect Care:

- Use the “Respiratory Infection (inc. COVID-19) NAT” smart group.
- For ordering instructions, refer to the bulletin “New Connect Care Orders for COVID-19 and Other Respiratory Virus Tests” (Dec. 15, 2020): <https://www.albertahealthservices.ca/assets/wf/lab/if-lab-hp-bulletin-new-connect-care-orders-for-covid-19-and-other-respiratory-virus-tests.pdf>

- A few notable changes have occurred since Dec 2020:
 - If COVID-19 symptoms are indicated for patients “admitted or ED patient likely to be admitted” or “ED patient likely to be discharged”, then “rapid COVID-19” testing will be automatically selected.
 - If influenza and RSV testing is required for patients with ILI, “Influenza and RSV NAT” must be manually selected.
 - A specific smart group with defaults set for ETT’s/BAL’s can be added to your preference list upon request if you order this testing on ETT’s and BAL’s more frequently than other specimen sources.
- If your site has ID NOW COVID-19 testing available:
 - If ID NOW is indicated, use the “Respiratory Infection (inc. COVID-19) NAT” smart group to place the ID NOW and COVID-19 PCR/NAT order.
 - Contact the laboratory to get an ID NOW kit, and collect one swab for ID NOW and one for COVID-19 NAT/PCR.
 - If the ID NOW test is negative: the second sample collected for COVID-19 NAT/PCR will be sent for testing.
 - If the ID NOW test is positive: the second sample collected for COVID-19 NAT/PCR testing will have the test cancelled as no confirmation is required. The second sample collected will be forwarded to ProvLab for variant testing.

2. Pediatric Blood Culture

- Changes to the collection guidelines for pediatric blood cultures have been made to optimize the sensitivity of blood cultures and help identify true line infections vs. contaminants. Blood cultures should always be collected from two (2) sites in patients >30kg and is suggested for all patients except neonates.
- For patients weighing ≤30kg, use the “Blood Culture Panel-Pediatric (weight based)” order set. Bottles will be ordered and collected as follows:

Body Weight (kg)	Site 1	Site 2	Number of bottles to be collected
Less than or equal to 5 kg	Pediatric Bottle Minimum 1 mL		1
5.1 - 12.7 kg	Pediatric Bottle 4 mL	Pediatric Bottle 2-4 mL	1-2
12.8 kg - 30 kg	Aerobic + Anaerobic 10 mL + 10 mL	Aerobic 10 mL	2-3
Greater than 30 kg	Aerobic + Anaerobic 10 mL + 10 mL	Aerobic + Anaerobic 10 mL + 10 mL	4

- For patients weighing >30kg, use the “Blood culturesx2” regardless of patient age.

3. Most microbiology/virology tests that were previously not orderable in SCM and required paper requisitions can now be ordered in Connect Care. Check Connect Care first before ordering on paper requisition.
4. Further changes to Microbiology orders in Connect Care vs. SCM are summarized in the table below:

Microbiology orders in Connect Care vs. Legacy (SCM):

Connect Care Order Name	Legacy (SCM) Order Name	Notes
ROUTINE BACTERIOLOGY		
FLUID CULTURE, TISSUE CULTURE, WOUND CULTURE (Swab, Deep), BONE CULTURE, BONE MARROW CULTURE BLOOD CULTURE ROUTINE	Anaerobic Culture	Previously, clinicians could specifically request anaerobic culture when bacterial cultures were ordered. This is no longer necessary as the lab will automatically perform anaerobic culture when appropriate, based on the specimen received.
BLOOD CULTURE PANEL – PEDIATRIC (WEIGHT BASED)	Blood Culture, Neonate (single set) Blood Culture, Pediatric <14yrs (single set)	Some preference lists may include this order. DO NOT use this, as this will only order one set of blood cultures. 2 sets of blood cultures are almost always indicated. Instead use one of the orders listed below. Use “Blood Culture Panel-Pediatric (weight based)” for children weighing ≤30kg. Use BLOOD CULTURE X 2 for children weighing >30kg.
BLOOD CULTURE PANEL – ADULT x 2 or BLOOD CULTURE X 2	Blood Culture, Adult (order set for 2 sets blood cultures)	Use for all patients weighing >30kg.
ORDER PANEL: BLOOD CULTURE – ADULT X 3 (ENDOCARDITIS)	Blood Culture, Adult Endocarditis (order set for 3 sets blood cultures)	Available in the Connect Care Facility List.
IMPLANTED MEDICAL DEVICE CULTURE	Device Culture	Use for culture of explanted pacemakers, prosthetic joints, deep brain stimulators, etc. Do not use for catheter tips – use “Catheter Tip Culture” instead.
Not orderable.	WBC Stool	Follow process for tests not orderable in Connect Care.
PARASITIC INVESTIGATIONS		
FILARIAL BLOOD SMEAR	Microfilaria Blood Examination	Was not orderable in SCM (paper only). As per previous, consult the microbiologist on call before ordering.
STOOL PARASITE SCREEN OVA AND PARASITES, TISSUE AND/OR FLUID	Ova and Parasite Examination Source: Stool, Urine	Note that there are now separate orderables for ova & parasite examination of stool and tissue/fluid. SCM had a single orderable for all specimen sources.

Microbiology orders in Connect Care vs. Legacy (SCM):

Connect Care Order Name	Legacy (SCM) Order Name	Notes
INFECTION PREVENTION AND CONTROL		
ARO SCREENING MRSA AND CPO - MRSA Nasal and Inguinal Swab (1 order, 2 swabs) - MRSA wound swab - CPO Screen Screening will be triggered as per IPC current protocols.	ARO Hospital Admission Screen Adult: - MRSA Nasal swab - MRSA Rectal/ostomy Swab - MRSA Wound swab - VRE rectal/ostomy swab (routine screening discontinued in 2021) ARO Hospital Admission Screen Peds: - MRSA Nasal swab - MRSA Groin swab (umbilicus if <2 mo) - MRSA wound	This admission screening order panel is only accessible in Connect Care via the ARO Admission Screening Best Practice Advisory (BPA) which is part of RN and not MD workflow. This panel is not on MD Admission order sets. Tests are still accessible independent of order panel if needed. Based on new Infection Prevention and Control guidelines, MRSA screening will be performed on nasal + inguinal swabs, as opposed to the previous nasal + rectal swabs. The nasal/inguinal swab results will be reported as one order instead of two separate orders.
CARBAPENEMASE PRODUCING ORGANISMS SCREEN	Carbapenemase Producing Organisms (previously only orderable on paper requisition: 7828M Microbiology Infection Surveillance Requisition)	Should only be ordered by Infection Prevention and Control or by consultation with the Microbiologist on-call.
ESBL SCREEN	Not previously orderable.	Should only be ordered by Infection Prevention and Control or by consultation with the Microbiologist on-call.
PARASITIC INVESTIGATIONS		
FILARIAL BLOOD SMEAR	Microfilaria Blood Examination	Was not orderable in SCM (paper only). As per previous, consult the Microbiologist on-call before ordering.
STOOL PARASITE SCREEN; OVA AND PARASITES, TISSUE AND/OR FLUID	Ova and Parasite Examination Source: Stool, Urine	Note that there are now separate orderables for ova & parasite examination of stool and tissue/fluid. SCM had a single orderable for all specimen sources.
NOTE NAME CHANGE		
EYE CULTURE, INVASIVE	Critical Eye Bacterial Culture	
GENITAL CULTURE, BACTERIAL	Urogenital Bacterial Culture	
PHARYNGITIS SCREEN	Throat Beta Strep Test	
NAT	PCR/viral load	Note that you will see the acronym "NAT" in many tests. These are "nucleic acid tests" which include viral loads, polymerase chain reaction (PCR), or other molecular tests.